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Original article

Prevalence, classification and perception of allergic and nonallergic rhinitis in Belgium

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Background: Allergic rhinitis (AR) and noninfectious, nonallergic rhinitis (NINA) are common disorders, which may prompt patients to seek medical help.
Methods: We performed a survey in a representative sample of the Belgian population ($n = 4959$) with an overall prevalence of self-declared recent rhinitis symptoms of 39.3%. Detailed information on patients having experienced nasal symptoms over the past year was then obtained from a random sample of respondents ($n = 743$).
Results: The adjusted prevalence was 29.8% for AR and 9.6% for NINA, respectively. According to the ARIA classification, there was significantly more 'persistent' symptomatology in the AR group (40.8%) than in NINA (23.5%) ($P < 0.001$), and more 'moderate/severe' symptom intensity in AR (75.4%) than in NINA (53.1%) ($P < 0.001$). Allergic rhinitis patients suffered from a greater number of symptoms than NINA patients ($P < 0.001$). Asthma, skin and food allergy as co-morbidities were all found to be significantly more prevalent in the AR *vs* the NINA group ($P < 0.05$ for all). The percentage of consulting patients (total: 66.8%), who subjectively perceived their rhinitis as moderate/severe, was 94.0%, whereas 75.6% of these patients were classified accordingly based on ARIA criteria.
Conclusions: We found a high prevalence of self-declared rhinitis symptoms in the Belgian population, AR being about three times more prevalent than NINA. In addition, AR patients suffered from a greater number of symptoms and displayed a more 'persistent' and 'moderate–severe' ARIA profile than NINA. About 75% of patients seeking medical help suffer from 'moderate to severe' forms of rhinitis.

Key words: allergic rhinitis, ARIA classification, consultation, co-morbidity, non-allergic rhinitis, prevalence.

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Allergic rhinitis (AR) is a common condition, with reported prevalence in adult populations as high as 10–25% (1). Allergic rhinitis has typically been classified into a 'seasonal' and a 'perennial' form, based on the time of the exposition to specific allergens (2, 3). The ARIA guidelines (2001) have adopted a new classification, based on duration of symptoms ('intermittent' and 'persistent') and, in addition, proposed a grading of their severity ('mild' and 'moderate–severe'), respectively. Moreover, emphasis was put on co-morbidities, especially asthma (1).

The term 'noninfectious, nonallergic rhinitis' (NINA) is commonly applied to a diagnosis of any nasal condition in which the symptoms are similar to those seen in AR but an allergic and an infectious etiology have been excluded by proper clinical examination (1, 4). Currently, NINA is an exclusion diagnosis, as a generally accepted definition or diagnostic criteria are lacking. It is an umbrella term for a number of heterogeneous and poorly defined nasal conditions of unknown etiology and patho-physiology (1, 5).

The prevalence of both AR and especially NINA are not well known, due to inconsistent definitions used for selection of the patients and description of the disorder, or paucity of published studies. The aim of the current survey was to obtain an estimation of the prevalence of AR and NINA in Belgium and the proportion made up by the different forms of AR according to the ARIA classification; we also analyzed the NINA subgroup of patients using the same classification. We also studied the co-morbidities and, finally, we wanted to gain insight into the perception and into the motivation of the patient to consult a doctor.

Materials and methods

The target population of this survey consisted of subjects of 15 years of age and beyond, who indicated having suffered from rhinitis symptoms (not common cold-related) during the year preceding the survey. In order to achieve a representative sample for the Belgian population, mail addresses were randomly selected from a nameless database (CIM-fiche 2002) that is commonly used for Belgian survey studies. The sample had to match the socio-demographic variables sex, age and language of the Belgian population as

defined by the National Institute of Statistics (http://statbel.fgov.be/home_ul.asp). Before analyzing the data, socio-demographic data from the Belgian and respondent populations were compared. At the time of the study, Belgium counted 8 553 145 residents of the age of 15 and older.

Seven thousand individuals were asked: 'Did you suffer during the past year from a stuffed nose, watery runny nose, nasal itching, sneezing or irritation of the eyes (but not due to a common cold)?'

Answers to this question were obtained from 4959 (71%) of these 7000 subjects. About 39% of these 4959 subjects replied affirmatively.

A detailed questionnaire was sent out to a randomly assigned sample of these 1947 'yes'-respondents. This questionnaire, generated by the authors, was designed to obtain information about the duration and severity of the disease, the symptoms, the perception of disease impact and the co-morbidities, and finally the reasons to visit a doctor. Prior to the survey, its content was checked by a group of university experts and subsequently ran as a pilot in a limited number of rhinitis patients. TNS Dimarso (website: http://www.tns-global.be/Dimarso.htm) was the market research company who executed the survey.

In order to achieve a 95% confidence interval of 3% at a 25% outcome, and considering a 70% reply on sent questionnaires, we randomly sampled 1150 of the 1947 'yes'-respondents from the question in the first wave. Respondents to the detailed questionnaire constitute the population which is described in detail in this paper. The questionnaires were completed between June 26 and July 25, 2003.

Based on their replies, the self-declared rhinitis sufferers were divided into an AR and a NINA group. Patients with AR were further subdivided into 'seasonal' allergy (defined as allergic to tree and/or grass pollen but not suffering from a perennial allergy), 'perennial' allergy (defined as allergic to house dust mite and/or animal dander but not suffering from a seasonal allergy), 'seasonal and perennial' allergy (combinations of the preceding two types), or 'fungal' allergy (defined as allergic to fungi but not suffering from a seasonal or perennial allergy). Because of the small number of patients in the 'fungi-only' group ($n = 13$), this group was not considered as a separate subgroup and was not further analyzed. Patients who were unable to indicate allergy to a specific allergen and thus replied 'I don't know what I am allergic to' were considered as suffering from NINA.

In order to classify the disease based on *duration*, the patients were asked for the number of weeks with symptoms as well as the number of days during these weeks when symptoms were present. Persistent AR was defined as symptoms being present for >4 days/week and this for >4 weeks. In order to classify the disease based on *severity*, the interference (or not) with sleep, daily activities (sport, leisure) and work or school attendance as well as the perceived severity of the symptoms (troublesome or not) were questioned. According to the ARIA criteria, patients were classified 'moderate/severe' if at least one of the criteria 'sleep, daily activities and work/school attendance' was impaired (score 'sometimes, regular, all the time'), or if the symptom severity was rated as troublesome. The other patients were classified as 'mild'.

The NINA group suffered from rhinitis symptoms, but replied negative to all of the 'allergic' categories mentioned above, and replied positive on at least one of the following nonspecific triggers: cigarette smoke, exhaust gases, air-conditioning, temperature changes, position changes, perfume, 'don't know to what I am allergic' or 'other'.

Despite the fact that ARIA guidelines are developed for AR, we classified NINA patients according to the same definitions in order to compare the characteristics of the AR and NINA groups in terms of duration and severity of symptoms.

Data on co-morbidities were available, based on specific questionnaire items on 'asthma', 'chronic rhinosinusitis' (lumping the separate items 'chronic sinusitis' and 'nasal polyps'), 'skin allergy' and 'food allergy' and eye symptoms, cough, breathlessness and wheezing.

Statistical analysis

The statistical analysis is purely descriptive by use of SPSS 12.0 for Windows (SPSS Inc., Chicago, IL, USA). The chi-squared test was used to detect differences in repartition in cross tables. Differences between groups for nonparametric data were evaluated using the Mann–Whitney test. In order to weight whether a symptom drives the patient to visit a GP and to define whether an observation is more current in persistent compared with intermittent allergic rhinitis patients, the relative risk and its 95% CI have been estimated. Odds ratios were not calculated because the probability to visit a doctor was too high. Significance level was set on 5% double-sided.

Results

The socio-demographical characteristics of the population that replied to the first ($n = 4959$) and the second wave (detailed questionnaire, $n = 754$) are described in Table 1. Considering a CI of 95% for a 30% and 50% outcome in the first (95% CI: 1.28% and 1.39%, respectively) and second population (95% CI: 3.27% and 3.57%, respectively), no significant deviation from the Belgian population (CIM-fiche 2002, http://www.cim.be) could be found.

Of the 4959 subjects who returned the initial questionnaire, 1947 answered affirmative. This reflects a prevalence of self-declared recent rhinitis symptoms of 39.3% (95% CI: 37.9–40.6%). In the second wave, 754 of 1150 addressed patients replied (response rate of 65.6%); because of incomplete data, 11 of the 754 patients could not be classified in either AR or NINA. From the remaining 743 respondents, 562 were considered AR

Table 1. Socio-demographical characteristics of the respondents to the first and second questionnaires, when compared with the characteristics of the Belgian population. Adjusted prevalence of self-declared rhinitis observed in patients of the second wave ($n = 754$). Adjusted prevalence for allergic rhinitis (AR) and non-infectious, nonallergic rhinitis (N/NA) within the whole population was 29.8% (95% CI: 27.6–32.1%) and 9.6% (8.0–11.0%) respectively

	First wave ($n = 4959$), %	Second wave ($n = 754$), %	Belgium CIM norm 2002, %	Prevalence, %	
				AR (95% CI)	NINA (95% CI)
Sex					
Male	47.8	44.7	48	29.7 (24.8–34.6)	9.5 (6.4–12.7)
Female	52.2	55.3	52	29.7 (25.3–34.1)	9.6 (6.7–12.4)
Language					
Flemish	59.4	60.3	58.8	29.4 (25.2–33.6)	9.9 (7.1–12.6)
French	40.6	39.7	41.2	30.1 (24.9–35.4)	9.1 (5.8–12.5)
Age, years					
<35	29.1	29.0	31	32.6 (26.4–38.8)	6.7 (3.4–10.0)
35–54	36.9	34.7	36	30.4 (24.8–35.9)	8.9 (5.4–12.4)
>54	34	36.3	33	26.7 (21.3–32.0)	12.6 (8.6–16.6)

(75.6%; 95% CI: 72.9–79.0%). The other 181 subjects (24.4%; 95% CI: 21.0–27.1%) were defined as suffering from NINA. The adjusted prevalence of AR reveals to be 29.8% (27.6–32.1%), and that of NINA to be 9.6% (8.0–11.0%). Eighty-five NINA patients stated to react to at least one of the above-defined nonallergic categories, 77 did not know to what they reacted and 37 (18 of which belong to the group of 85) answered to be 'reactive to other triggers'. The adjusted prevalence of AR appeared to decrease with increasing age, whereas the opposite was observed for NINA (Table 1). The numbers of AR patients in the specific allergy categories and the numbers of subjects reporting the triggering factors used in the definition of NINA are shown in Table 2.

The patients in both AR and NINA groups were classified according to the ARIA criteria. Complete data, allowing patients to be classified, were available on 554 of the 562 AR patients and on 179 of the 181 NINA patients (Table 3). The repartition of AR and NINA patients across the four ARIA groups is clearly different ($P < 0.001$). There is more 'persistent' disease in the AR group (40.8%) than NINA (23.5%; $P < 0.001$); there is also significantly more 'moderate/severe' symptomatology in the AR group (75.4%) than in NINA (53.1%; $P < 0.001$).

There was a clear underestimation of the severity of the rhinitis as perceived by the patients. In the AR and NINA group, 34.2% and 15.1% of the subjects described the severity as moderate to severe, compared with 75.4% and 53.1% based on the ARIA criteria, respectively (both $P < 0.001$) (data not shown).

In general, AR patients noted a higher number of symptoms than NINA patients (median number per patient AR: 4, NINA: 2; Mann–Whitney: $P < 0.001$) (Table 4). Rhinorrea (63.0%) and sneezing (75.1%) were the most frequently reported individual symptoms overall. The prevalence of each individually studied symptom was greater in the AR group than in the NINA group, reaching statistical significance, except for 'facial pain' and 'cough' (Fig. 1). According to the ARIA classification, nasal obstruction is present in about 50% in both AR and NINA, with exception of both mild intermittent groups, where it was lower (25.0% for AR and 28.6% for NINA). Lower respiratory tract symptoms, such as cough, dyspnea and wheezing were clearly more prominent in both (intermittent and persistent) 'moderate/severe' subtypes of AR (48.9% and 42.0% for cough, 41.4% and 47.9% for dyspnea, and 45.5% and 39.0% for wheezing, respectively). This was not the case in the NINA group. Eye symptoms were less frequent in the NINA group (NINA: 29.5%, AR: 55.6%, $P < 0.001$) (Fig. 1).

Asthma, skin allergy and food allergy were all significantly more prevalent in the AR group, when compared with the NINA group ($P < 0.05$ for all); the prevalence of frequent or persistent cold and chronic rhinosinusitis was comparable between groups (NS) (Fig. 2). Within the AR group itself, common cold was more common in persistent than in intermittent AR ($P = 0.001$), and in moderate/severe than in mild AR ($P = 0.002$), respectively. Differences between the other co-morbidities were nonsignificant.

From the 754 patients, 504 (66.8%) replied affirmatively to the question 'Have you already discussed your complaints with a doctor?' Significantly more AR (75.3%) than NINA (43.6%) patients did so. A multivariate test, however, revealed no significant difference between AR and NINA patients concerning eventual differences in motivation to visit a doctor. Allergic rhinitis patients who consulted reported a greater mean cumulative number of separate allergies than those who did not, i.e. 962 separate allergies were reported by 420 consulting patients (mean of 2.3 specific allergies per patient), whereas 209 separate allergies were reported by 138 nonconsulting patients (mean of 1.5 specific allergies per patient) (Table 5).

A significantly ($P < 0.001$) greater percentage of patients with moderate/severe rhinitis (75.6%) than with mild rhinitis (49.8%) consulted; a significantly greater ($P < 0.001$) fraction of patients, suffering from persistent

Table 2. The numbers of allergic rhinitis (AR) patients who indicated allergy to specific allergen(s) and the numbers of subjects reporting the triggering factors used in the definition of noninfectious, nonallergic rhinitis (NINA) (more than one allergen or stimulus per patient possible)

	AR ($n = 562$)		NINA ($n = 181$)	
Allergic to	n	% AR (95% CI)	n	% NINA (95% CI)
Grass pollen	349	62.1 (58.1–66.1)	–	–
Tree pollen	269	47.9 (43.8–52.1)	–	–
House dust mite	228	40.6 (36.6–44.7)	–	–
Animal dander	174	31.0 (27.2–34.8)	–	–
Fungi (in-/outdoor)	98	17.4 (14.3–20.5)	–	–
Herb	63	11.2 (8.6–13.8)	–	–
Cigarette smoke	164	29.2 (25.4–33.0)	36	19.9 (14.1–25.7)
Temperature changes	108	19.2 (15.9–22.5)	35	19.3 (13.6–25.1)
Perfume	94	16.7 (13.6–19.8)	16	8.8 (4.7–12.9)
Air-conditioning	92	16.4 (13.3–19.5)	32	17.7 (12.1–23.3)
Exhaust gases	91	16.2 (13.2–19.3)	27	14.9 (9.7–20.1)
Position changes	39	6.9 (4.8–9.0)	9	5.0 (1.8–8.2)
I don't know to what	–	–	77	42.5 (35.3–49.7)
Others	55	9.8 (7.3–12.3)	37	20.4 (14.5–26.3)

Table 3. Classification of allergic rhinitis (AR) and noninfectious, nonallergic rhinitis (NINA) patients according to the ARIA guidelines

	ARIA				
	Mild intermittent (%)	Mod/Sev intermittent (%)	Mild persistent (%)	Mod/Sev persistent (%)	Total (n)
AR	19.5	39.7	5.1	35.7	554
Seasonal	22.7	33.5	3.9	39.9	233
Perennial	29.7	47.5	6.9	15.8	101
Seasonal and perennial	11.1	40.6	5.8	42.5	207
Fungi alone	15.4	76.9	0	7.7	13
NINA	40.2	36.3	6.7	16.8	179
Total (n)	180	285	40	228	733

Table 4. Clinical characteristics and profile of allergic rhinitis (AR) and noninfectious, nonallergic rhinitis (NINA) patients

Observation	Persistent AR	Intermittent AR	Significance	NINA
Mod/severe (ARIA)				
%	87.6	66.5	*	53.1
RR (95% CI)	1.318 (1.200–1.445)			
Mod/severe (subjective)				
%	53.8	21.5	*	14.9
RR (95% CI)	2.500 (1.965–3.185)			
Rhinorrea				
%	71.1	63.2		52.2
RR (95% CI)	1.126 (1.267–1.001)			
Nasal obstruction				
%	57.8	41.5	*	38.2
RR (95% CI)	1.393 (1.174–1.653)			
Nasal itching				
%	53.8	39.9	*	27.0
RR (95% CI)	1.346 (1.124–1.613)			
Sneezing				
%	84.4	76.5	*	60.7
RR (95% CI)	1.104 (1.017–1.199)			
Ocular erythema				
%	63.6	50.2	*	29.2
RR (95% CI)	1.267 (1.094–1.468)			
Cough				
%	24.9	22.6		17.4
RR (95% CI)	1.101 (0.813–1.493)			
Facial pain				
%	5.3	0.9	*	3.4
RR (95% CI)	5.747 (1.639–20.000)			
Dyspnea				
%	31.1	21.1	*	9.0
RR (95% CI)	1.477 (1.109–1.969)			
Wheezing				
%	23.6	22.3		9.0
RR (95% CI)	1.037 (0.744–1.443)			
Other				
%	4.0	4.6		5.1
RR (95% CI)	0.861 (0.384–1.934)			
Frequent/persistent cold				
%	57.0	40.8	*	47.9
RR (95% CI)	1.397 (1.145–1.701)			
Asthma				
%	25.1	28.6		13.7
RR (95% CI)	0.880 (0.638–1.214)			
Skin allergy				
%	43.0	40.0		26.5
RR (95% CI)	1.075 (0.685–1.351)			
Food allergy				
%	14.5	16.3		7.7
RR (95% CI)	0.890 (0.656–1.403)			
Chronic rhinosinusitis				
%	38.0	29.0		35.0
RR (95% CI)	1.311 (1.000–1.718)			
Number of symptoms (median)	4	3	*	2

*Significant differences between persistent and intermittent AR ($P < 0.05$). No statistical comparisons were made for the NINA group.
RR, relative risk between persistent AR and intermittent AR.

(81.9%) than from intermittent forms (59.8%) consulted. The percentage of patients seeking medical advice, who *perceived* their rhinitis as moderate/severe (94.0%) was

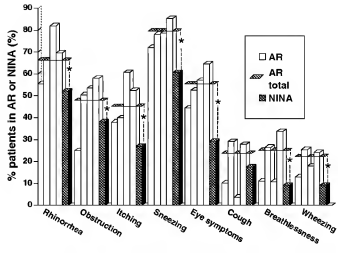

Figure 1. Prevalence of individual symptoms in the allergic rhinitis (AR) group as a whole ($n = 554$) and its subgroups, according to ARIA (from right to left: mild, moderate/severe intermittent, mild and moderate/severe persistent with 108, 220, 28 and 198 patients, respectively) and the noninfectious, nonallergic rhinitis (NINA) ($n = 179$) groups. Prevalence expressed as percent of individual (sub)group. Differences (*$P < 0.05$) in prevalence between total group AR and NINA. 'Facial pain' and 'others' not shown (both NS).

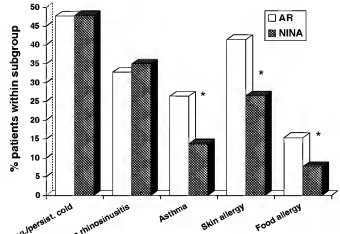

Figure 2. Co-morbidities in the allergic rhinitis ($n = 554$) and the noninfectious, nonallergic rhinitis ($n = 179$) subgroups (*$P < 0.05$).

clearly higher than the one based on ARIA definitions (75.6%), suggesting that subjective factors influence the decision to consult (or not).

Consulting patients had more symptoms in general, and suffered to a significant degree from lower respiratory tract symptoms than those who did not consult, and this more marked in AR than in NINA. For AR patients, the differences between consulting and nonconsulting patients were significant at the level of the upper respiratory tract for rhinorrea, nasal obstruction and nasal itch, but

Table 5. Numbers of allergic rhinitis (AR) patients with specific self-reported allergies among those who consulted a doctor and among those who did not consult a doctor (more than one allergen per patient possible)

AR patients	Visited a doctor ($n = 420$)		Did not visit a doctor ($n = 138$)	
Allergic to	n	% AR (95% CI)	n	% AR (95% CI)
Grass pollen	269	64.0 (59.4–68.6)	77	55.8 (47.5–64.1)
Tree pollen	220	52.4 (47.6–57.2)	46	33.3 (25.4–41.2)
House dust mite	193	46.0 (41.2–50.8)	34	24.6 (17.4–31.8)
Animal dander	141	33.6 (29.1–38.1)	32	23.3 (16.3–30.4)
Fungi (in-/outdoor)	83	19.8 (16.0–23.6)	14	10.1 (5.1–15.1)
Herb	56	13.3 (10.1–16.6)	6	4.3 (0.9–7.7)

not for sneezing. For NINA patients, differences were not statistically significant. Eye symptoms, on the contrary, were significantly more present in consulting than in nonconsulting patients, for AR as well as for NINA (38.5% *vs* 22.4%, relative risk: 1.49; 95% CI: 1.08–2.05) (Fig. 3 – data for NINA not shown).

Discussion

In this survey, we found an overall prevalence of self-declared rhinitis symptoms of 39.3% in a representative Belgian population. About three-quarters of subjects were classified as AR, and about one-quarter as NINA. The adjusted prevalence of AR was nearly 30%, being about threefold higher than for NINA. No clinical evaluation has been carried out afterwards to confirm the diagnosis of AR, and no data on IgE-mediated allergy were known; this may have potentially led to some incorrect diagnosis. However, the majority of patients [504 of 754 (66.8%)] stated that they had previously consulted a doctor because

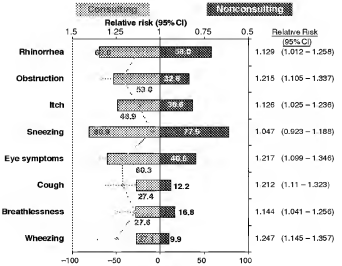

Figure 3. Comparison of symptom recording in allergic rhinitis patients who consulted a physician and those who did not.

of their nasal problems, lending additional support to the validity of our results, reducing to a significant degree the potential for incorrect diagnosis.

It is difficult to compare our data with the data from the literature. There is significant heterogeneity in the profile of the populations targeted (e.g. representative population sample, patients consulting a clinic etc.), as well as in the definitions and techniques used. Studies in AR, performed prior to and following the publication of the ARIA guidelines (1) respectively, use a different classification, the former 'seasonal' and 'perennial' labels having been replaced by nontransferable 'intermittent' and 'persistent' labels.

Bauchau et al. performed a two-step population-based survey in adults (telephone screening followed by clinical confirmation), and found a prevalence of clinically confirmable AR of 29% for Belgium, being the highest prevalence of the six European countries covered. This figure was confirmed by our results (6). Jones et al. performed a questionnaire-based survey in subjects of over 14 years old in the Nottingham area and found a prevalence of seasonal AR of 19.6%. The prevalence of perennial symptoms in individuals who did not have hay fever was 8.6%; this would include those with perennial AR, and nonallergic conditions (7). Olsson et al. performed a questionnaire-based survey in adults in the Stockholm County and detected a prevalence of allergic rhinoconjunctivitis of 24% and of nonallergic rhinitis of 19% (8). Finally, the findings of Montnémery et al. were also obtained from a questionnaire-based survey in adults in Malmö; 32.7% of subjects responding reported significant nasal symptoms. Further analysis suggested that nonallergic rhinitis was probably a dominating form in 12.4% of the study population (9).

The conclusions based on the results of any survey are only valid when the population, which is sampled and analyzed, is representative for the general population. In the current survey, selection bias was avoided by randomly selecting patients from an existing, nameless database which matched the socio-demographic parameters sex, age and language (reflecting the geographical distribution) of the Belgian population. The socio-demographic characteristics of the sample of responders, which was analyzed, were again compared with that of the general population, and were found to be representative (Table 1).

The ARIA classification has been developed for use in AR (1); there is currently no generally accepted classification system for NINA, the clinical characteristics of which have in general been poorly studied (10, 11). In order to compare their clinical characteristics, we applied the same ARIA-defined criteria for duration and severity to both AR and NINA. To the best of our knowledge, this is a novel approach, which has not been reported to date, shedding a new light on this less well-studied NINA group. Comparison shows that AR patients suffer significantly more from 'moderate/severe' and 'persistent' disease than NINA patients. Moreover, they suffered

from a greater median number of individual symptoms. Overall, rhinorrea and sneezing were the most frequently occurring symptoms. Nasal obstruction, the potentially most troublesome nasal symptom, was present in roughly about 50% of subjects, except in the 'mild-intermittent' form, and this quite similar for AR and NINA.

Asthma, skin allergy and food allergy as co-morbidities were significantly more prevalent in AR than in NINA. In the literature, asthma has been found in 19–38% of subjects with a history of AR (12), which is in keeping with the 25% in the AR group in our survey (Fig. 2). In contrast, frequent or persistent cold episodes as well as chronic rhinosinusitis were not different between groups, questioning the impact of atopy on those diseases.

When we compare the ARIA-defined severity with that subjectively perceived by the patient, we observe a striking underestimation of severity by the subjects, and this in all subgroups of the sample population. This observation is similar to what has been noted in other, large-scale surveys in other chronic respiratory pathologies like asthma (the AIRE survey) (13) and COPD (the Confronting COPD survey) (14). With this in mind, we assessed what drives a patient to see his/her doctor. A significantly greater percentage of subjects with ARIA-defined 'moderate/severe' and 'persistent' forms consulted. An interesting additional finding, however, was that subjects, who *perceived* their rhinitis as 'moderate–severe' consulted much more frequently than those with an ARIA-defined 'moderate–severe' form (94% *vs* 75.6%, respectively). This suggests that the perception, which the subject has on the severity of his/her disease, influences the decision whether or not to consult. A number of symptoms likely to induce a consultation included nasal, eye and lower airway symptoms. As no clinic visits were planned in our survey, we could not address the issue of potential under-diagnosis.

In conclusion, we detected a high frequency of nasal symptoms in our studied population. Allergic rhinitis was about threefold more prevalent than NINA, and was associated with a more severe and persistent ARIA-defined disease profile as well as with a greater number of individual symptoms; subjects with self-declared AR also suffered to a greater extent from co-morbidities. In addition, our data suggest that NINA is not rare in the general population and that, given the heterogeneity of disorders within this group, it may be pragmatical to classify them according to the ARIA criteria, originally developed for AR.

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